

Series V4

Users Manual



**General Purpose
1/4 DIN Temperature Controller**



**TOTAL
CUSTOMER
SATISFACTION**



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Overview

The V4 1/4 DIN panel mount controller is a general purpose industrial PID temperature controller. The V4 provides a reliable cost-effective solution for most temperature control applications. Thermocouple, RTD, and Current and Voltage sensors are supported. Dual outputs can be configured to support heating and cooling. The secondary output can also be configured as an alarm.

V4 features include: a NEMA 4X front panel seal, a 3-year warranty, meets European CE requirements and has a 4 inch deep case with removable connectors for wiring convenience.

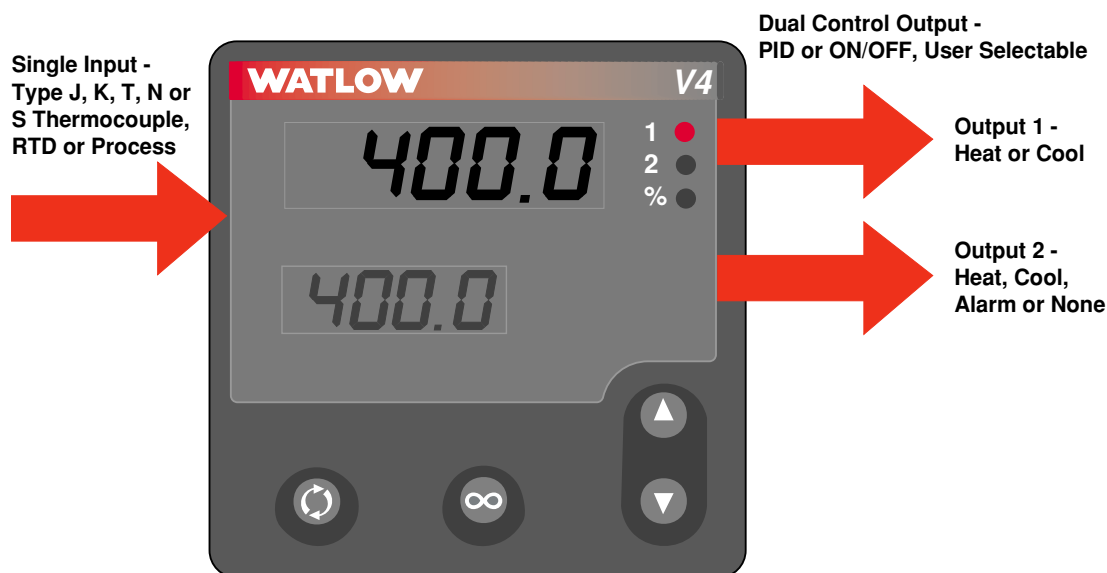


Figure 2a — Series V4 inputs and outputs.

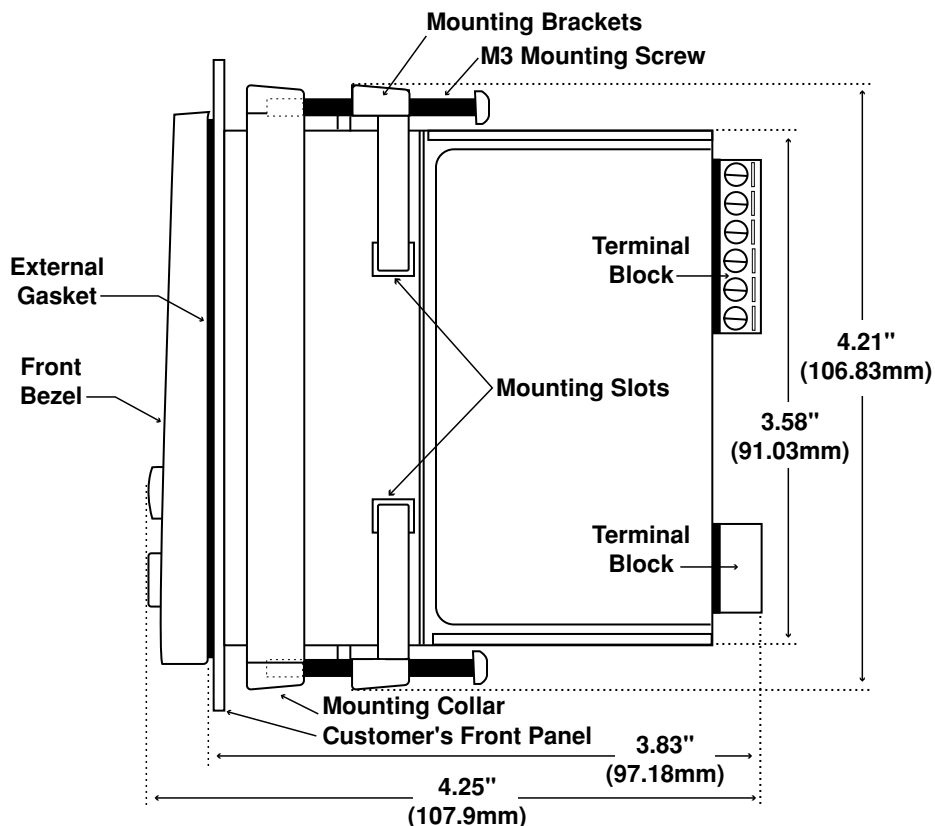


Figure 2b - Controller dimensions.

Installation and Removal

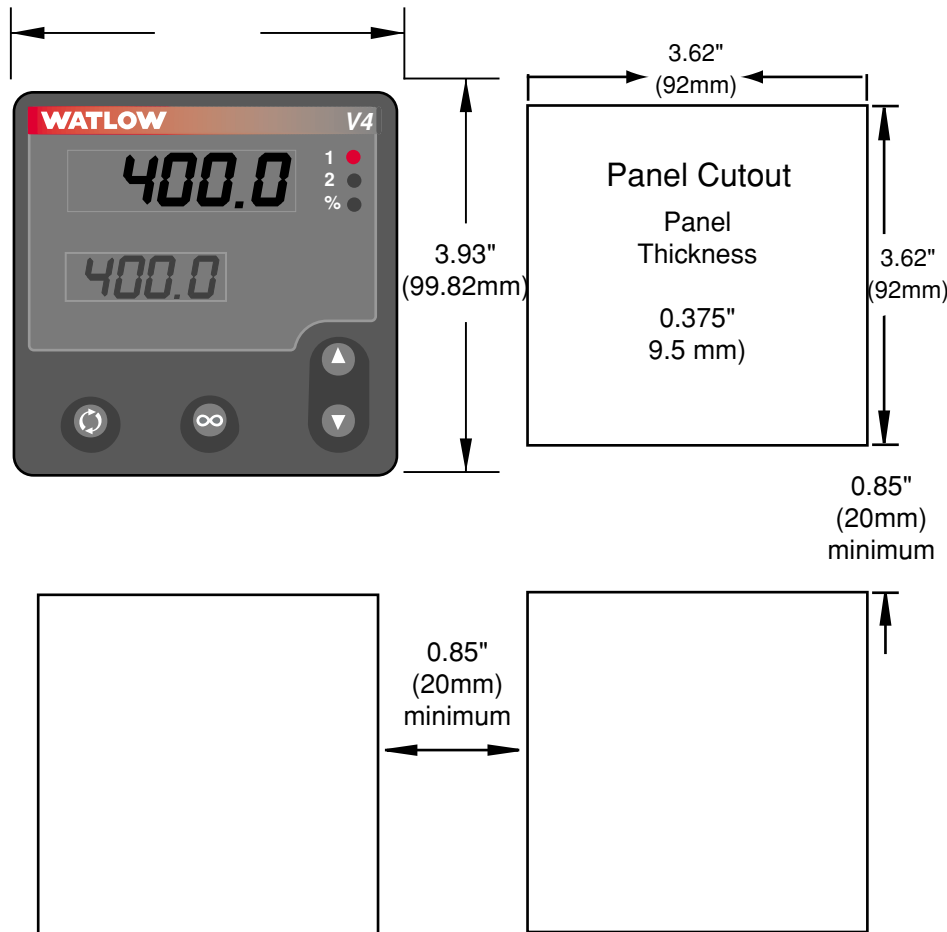


Figure 3 - Series V4 multiple panel cutout dimensions.

NOTE: Measurements between panel cutouts are the minimum recommended.

Installing the Series V4 Controller

Installing and mounting requires access to the back panel.

1. Make the panel cutout using the panel cutout dimensions as shown in Figure 4.
2. **Make sure the rounded side of the external case gasket is facing the panel surface.**
3. Check to see that the gasket is not twisted, and is seated within the case bezel flush with the panel.
4. Slightly compress the top and bottom side of the V4 Case while pulling the controller into the panel cutout (**Figure 5a**). Slide the mounting collar over the back of the controller. The tabs on the collar must line up with the mounting ridges on the case for secure installation. The tab holes are facing the back of the controller.
5. Adjust the mounting bracket screws enough to allow for the mounting collar and panel thickness. Snap the upper and lower mounting brackets on the case of the controller (**Figure 5 b**). Make sure all the grips are well engaged on the mounting slots of the controller. (The four screw heads are facing the back of the controller.)
6. Make sure the case is seated properly. Tighten the installation screws firmly against the mounting collar to secure the unit (**Figure 5c**). **To ensure NEMA 4X seal, there should be no space between the bezel and panel.** Over tightening the screws will distort the case and make it difficult to remove or replace the controller.

Installation and Removal (continued)

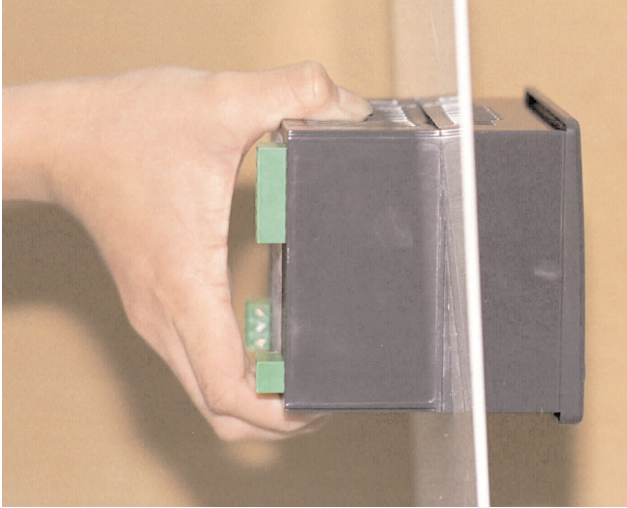


Figure 4a - Slightly compress the case while pulling the controller into the panel cutout.

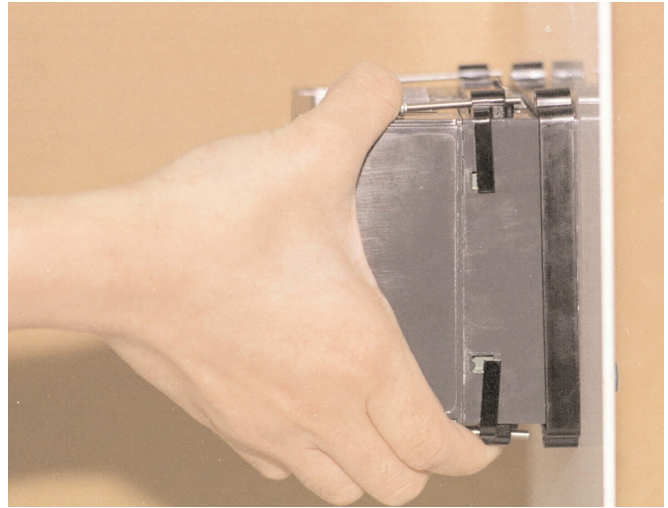


Figure 4b - Snap the top and bottom mounting bracket into the slots.

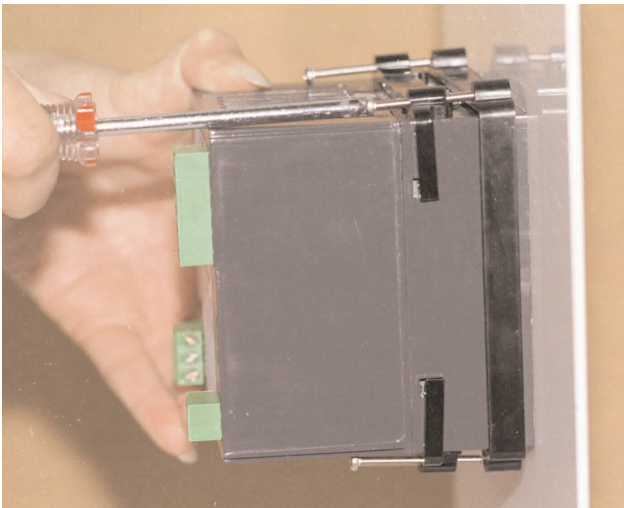


Figure 4c - Tighten screw to secure the controller.

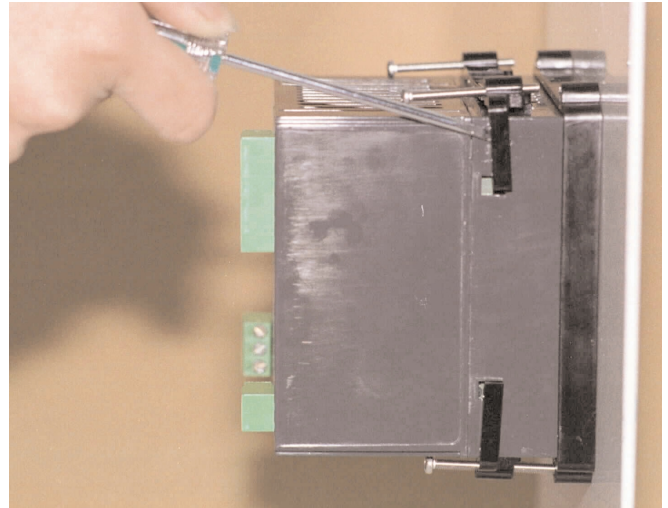


Figure 4d - Remove the controller using a flat screwdriver.

NOTE: Be careful not to over-tighten the screws. This may cause the mounting cover to fail. Over-tightening occurs when the front bezel is touching the customer's front panel.

Removing the Series V4 Controller

1. Loosen the upper and lower mounting bracket screws.
2. Use a flat screw driver to unsnap the four grips on the opposite side of upper and lower mounting brackets. Push the brackets back and forth gently until they can be pulled off easily.
3. Remove controller from the panel.



WARNING:

To avoid damage to property and equipment and/or injury or loss of life, use National Electric Code (NEC) standard wiring practices to install and operate this unit. Failure to do so could result in injury and/or death, or such damage.

NOTE:

Taking the unit out of the case is not a normal operating condition and should only be done by a qualified maintenance installation technician. Power to the case should be disconnected before removing or installing the controller into its case.



WARNING:

The case terminals may still carry live voltage when the unit is removed.



WARNING:

Irreversible damage will occur if high voltage is applied to the low voltage unit.

Wiring the Series V4

Power Wiring

High Voltage

100 to 240V~ (ac), nominal (85 to 264 actual) **V4TH** - - - - -

Low Voltage

14 to 24V~ (ac/dc) **V4TL** - - - - -

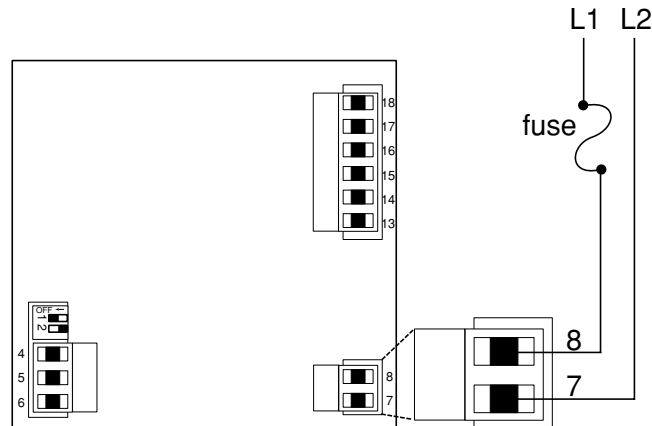


Figure 5 - Power wiring.

Sensor Installation Guidelines

We suggest you mount the sensor at a location in your process or system where it reads an average temperature. Put the sensor as near as possible to the material or space you want to control. Air flow past this sensor should be moderate. The sensor should be thermally insulated from the sensor mounting.

NOTE:

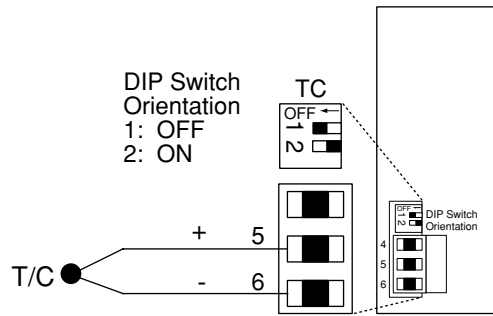
Successful installation requires five steps:

- Choose the controller's hardware configuration and model number;
- Choose a sensor;
- Install the controller;
- Wire the controller and
- Configure the controller.

Input Wiring

Figure 6a – **Thermocouple**

Extension wire for thermocouples must be of the same alloy as the thermocouple itself to limit errors.

**WARNING:**

To avoid damage to property and equipment and/or injury or loss of life, use National Electric Code (NEC) standard wiring practices to install and operate this unit. Failure to do so could result in injury and/or death, or such damage.

NOTE: When an external device with a non-isolated circuit common is connected to the 4-20mA or dc output, you must use an isolated or ungrounded thermocouple.

Figure 6b – **RTD (2- or 3-Wire) 100Ω Platinum**

There could be a +2°F input error for every 1Ω of lead length resistance when using a 2-wire RTD. That resistance, when added to the RTD element resistance, will result in erroneous input to the instrument. To overcome this problem, use a 3-wire RTD sensor, which compensates for lead length resistance. When extension wire is used for a 3-wire RTD, all wires must have the same electrical resistance (i.e. same gauge, same length, multiple-stranded or solid, same metal).

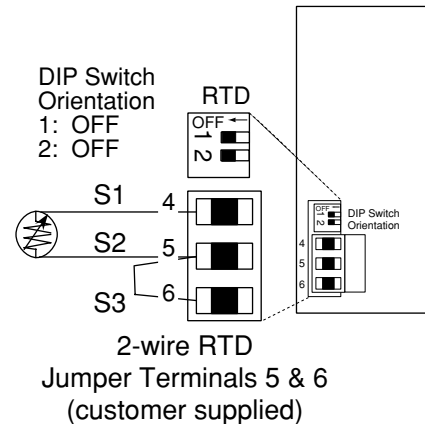
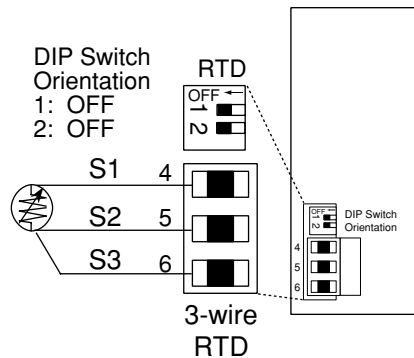


Figure 6c – **Process, 4-20mA**

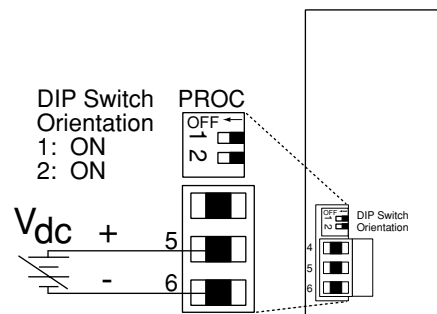
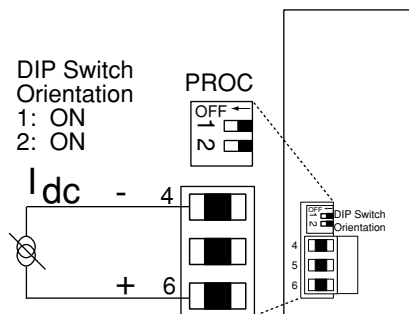
Input impedance: 5Ω

Figure 6d – **Process, 0-5V_{dc} (dc)**

Input impedance: 10kΩ



CAUTION: Process input does not have sensor break protection. Outputs can remain full on.



**WARNING:**

To avoid damage to property and equipment and/or injury or loss of life, use National Electric Code (NEC) standard wiring practices to install and operate this unit. Failure to do so could result in injury and/or death, or such damage.

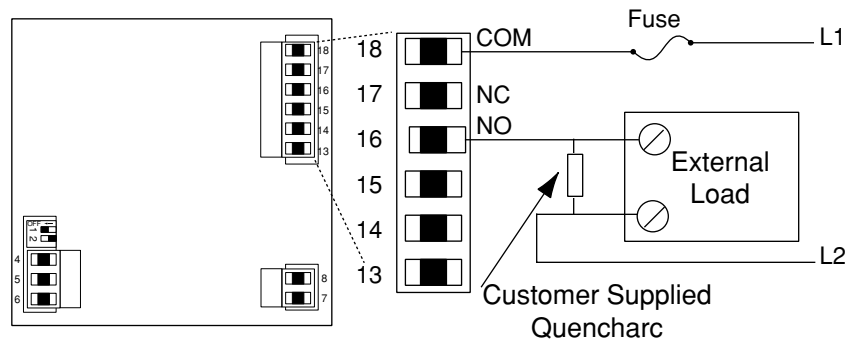
NOTE:

Switching inductive loads (relay coils, solenoids, etc.) with the mechanical relay, switched dc or solid-state relay output options requires use of an R.C. suppressor.

Watlow carries the R.C. suppressor Quencharc brand name, which is a trademark of ITW Pakron. Watlow Part No. 0804-0147-0000.

Output 1 Wiring

Figure 7a – **Mechanical Relay**
Without Contact Suppression

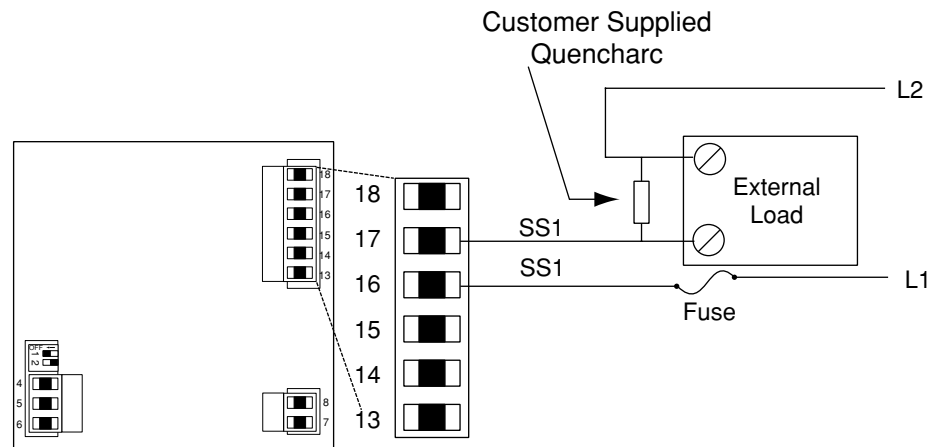


V4T _ - D _ _ _ - _ _ _ _

Form C, rated at 8A @ 125V~ (ac) or 5A @ 240V~ (ac)

Minimum load current: 100mA @ 5V= (dc)

Figure 7b – **Solid State Relay**
Without Contact Suppression

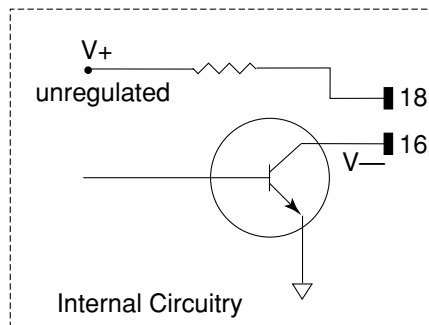
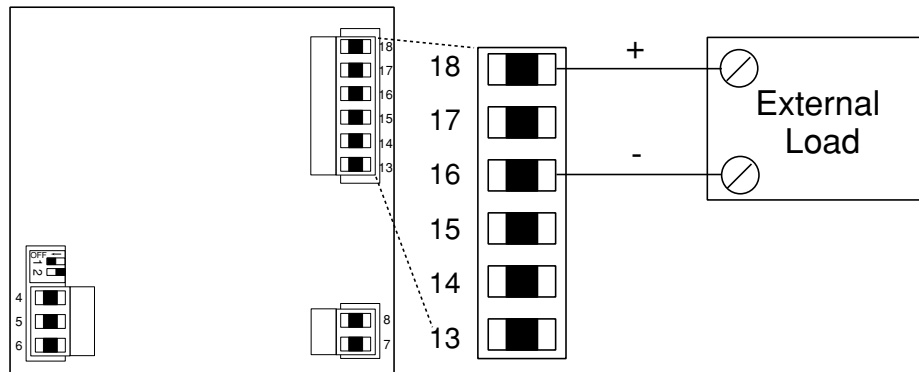


V4T _ - K _ _ _ - _ _ _ _

0.5 amps (AC loads only)

Output 1 Wiring

Figure 8a – **Switched DC, Open Collector**

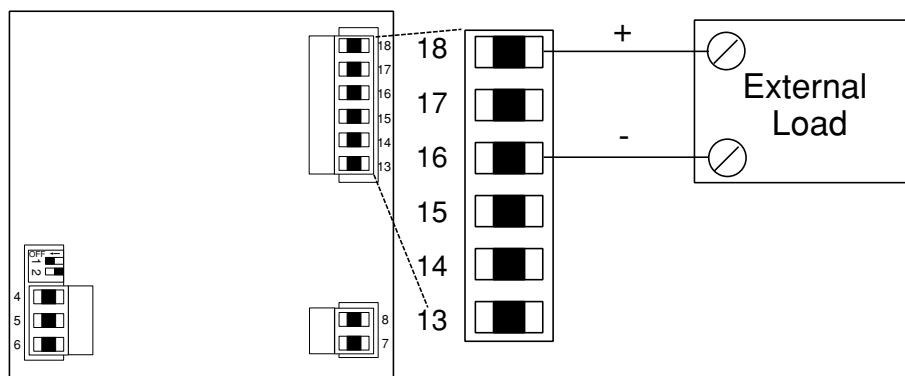


V4T _ - C _ _ _ - _ _ _ _

NOTE:

When an external device with a non-isolated circuit common is connected to the 4-20mA or dc output, you must use an isolated or ungrounded thermocouple.

Figure 8b – **4-20mA Process**

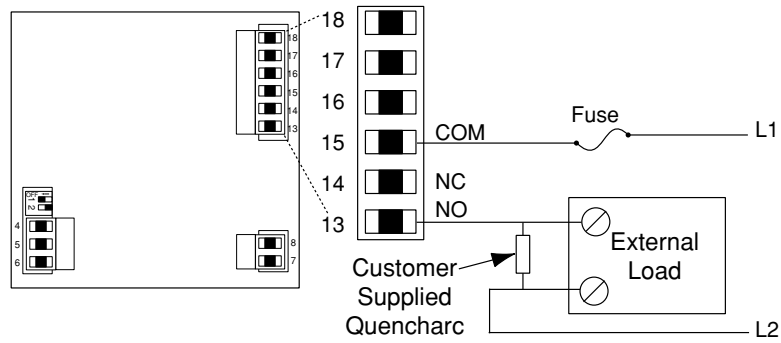


V4T _ - F _ _ _ - _ _ _ _

Maximum load impedance: 800Ω

Output 2 Wiring

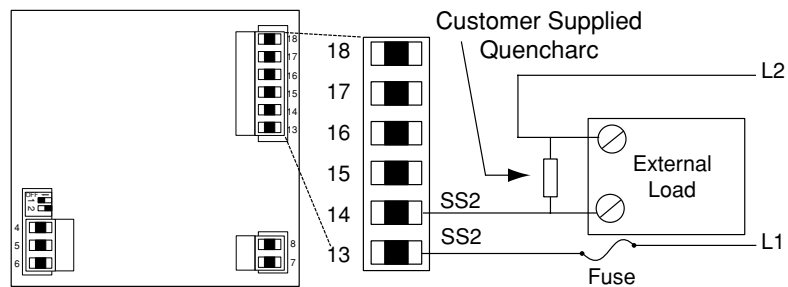
Figure 9a – **Mechanical Relay Without Contact Suppression**



V4T _ _ _ D _ _ _ _ _

Form C, rated at 8A @ 125V~ (ac) or 5A @ 240V~ (ac). Minimum load current: 100mA @ 5V= (dc)

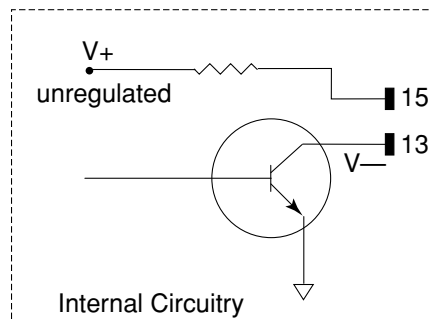
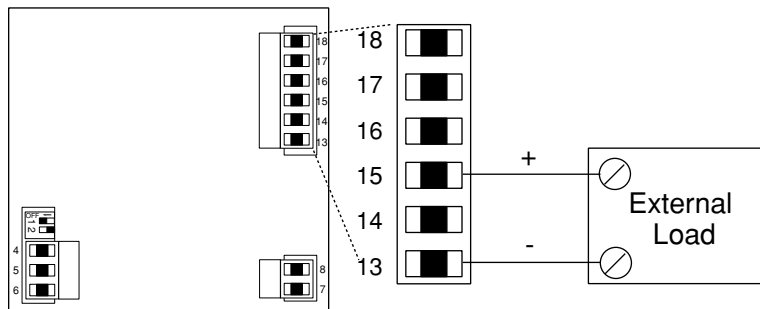
Figure 9b – **Solid State Relay Without Contact Suppression**



V4T _ _ _ K _ _ _ _ _

0.5 amps (AC loads only)

Figure 93 – **Switched DC, Open Collector**



V4T _ _ _ C _ _ _ _ _

Wiring Example



WARNING:

To avoid damage to property and equipment and/or injury or loss of life, use National Electric Code (NEC) standard wiring practices to install and operate this unit. Failure to do so could result in injury and/or death, or such damage.

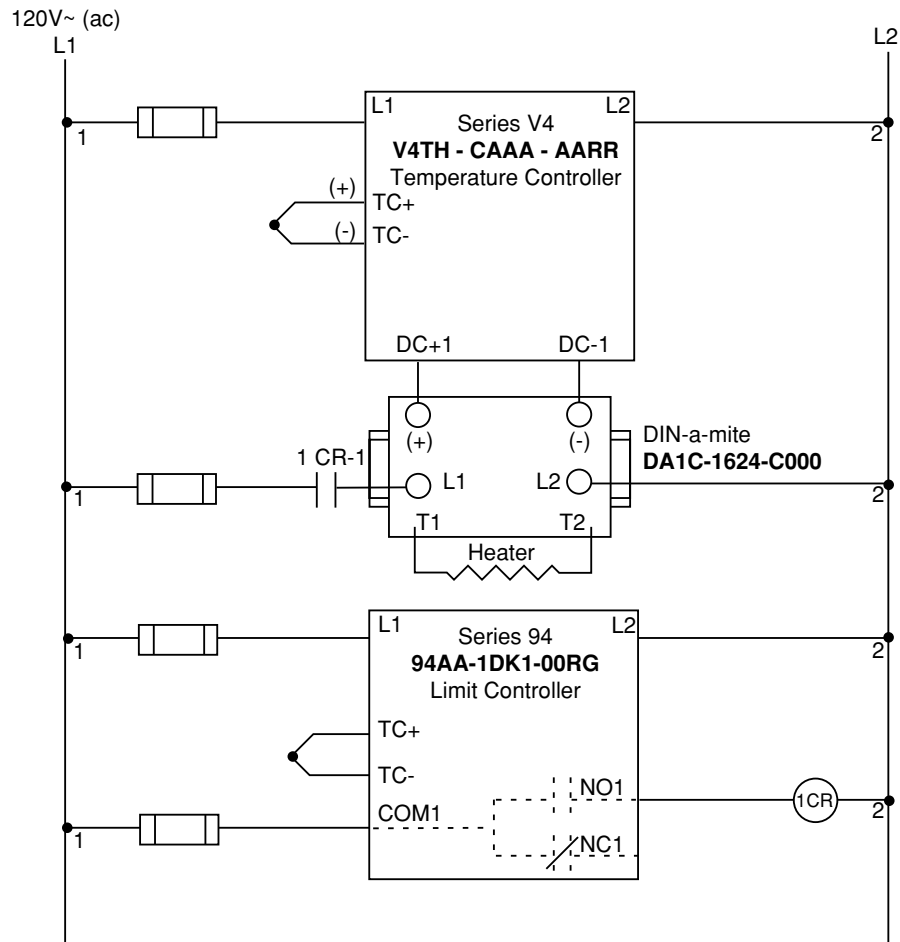
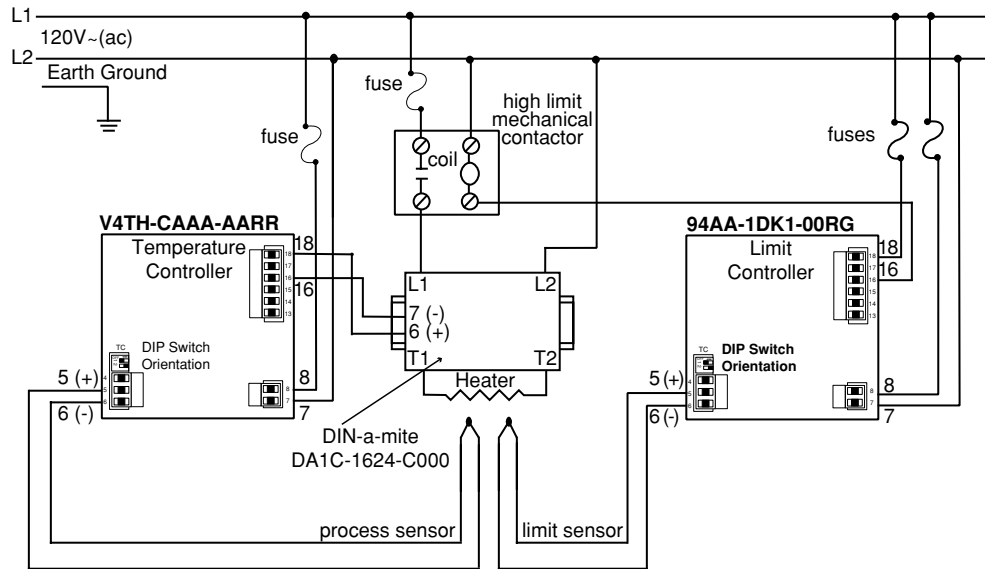
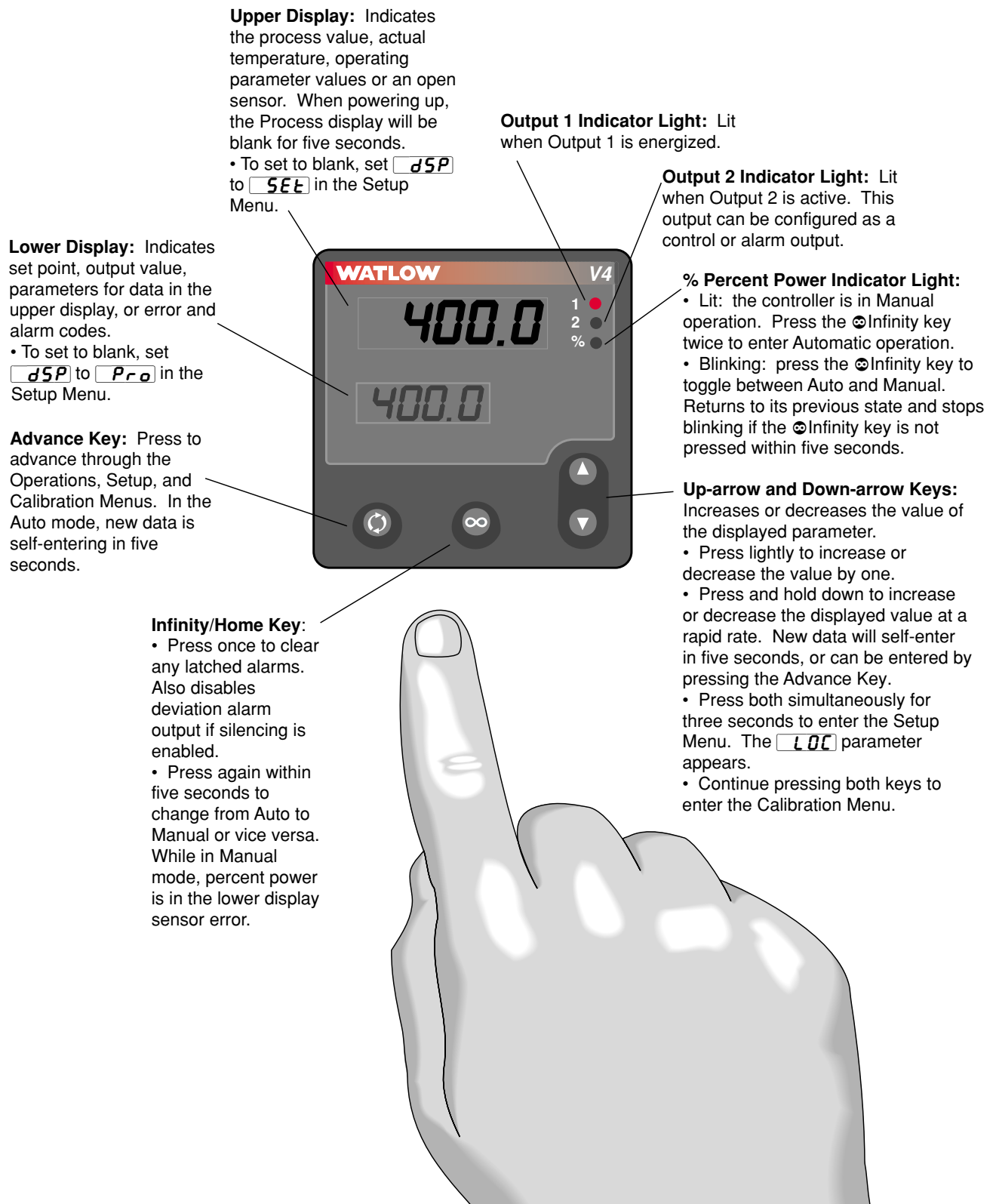


Figure 10 - System wiring example.

Keys and Displays



How to Set Up the Series V4



WARNING:

Remove power from the controller before removing the chassis from the case or changing the DIP switches. Removing the controller from the chassis is not a normal operating condition and should only be done by a qualified technician.

Setting up the Series V4 is a simple process. First set the DIP switches to match your input type. Refer to the orientation on the back of the controller to select the Input value. Next, configure the Series V4's features to your application in the Setup Menu, then enter values in the Operating Menu. Both tasks use the Advance key to move through the menus and the Up-arrow/Down-arrow keys to select data.

Before entering information in the Setup Menu, set the parameter. If is selected, °C, proportional band in % of span, derivative and integral are the defaults. If is selected, °F, proportional band in degrees, reset and rate are the defaults. **Changing the prompt will set parameters to their factory default. Document all current parameter settings first.** See the calibration section in the Appendix to change this parameter.

Entering the Setup Menu

The Operation Menu will appear as the default menu of the Series V4. The Setup Menu displays the parameters that configure the Series V4's features to your application.

Enter the Setup Menu by pressing the Up-arrow and Down-arrow keys simultaneously for 3 seconds. The lower display shows the Lock parameter, and the upper display shows its current level. All keys are inactive until you release both keys. You can reach the Lock parameter from anywhere.

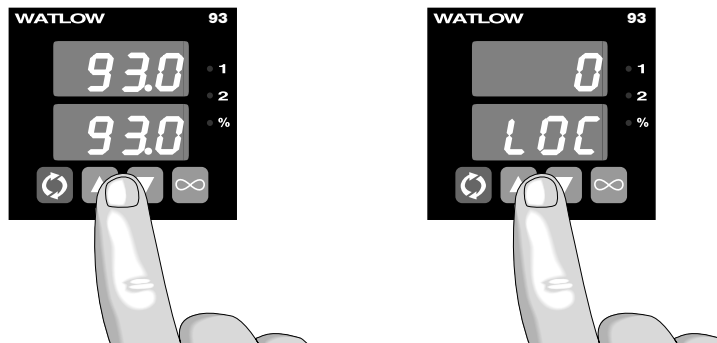


Figure 12a - Entering the Setup Menu.

Use the Advance key to move through the menus and the Up-arrow and Down-arrow keys to select data. You will not see all parameters in this menu, depending on the controller's configuration and model number. After stepping through the menu it returns to the set point parameter under the Operation Menu. If no keys are pressed for approximately 60 seconds, the controller returns to the default display, Process over Set Point.

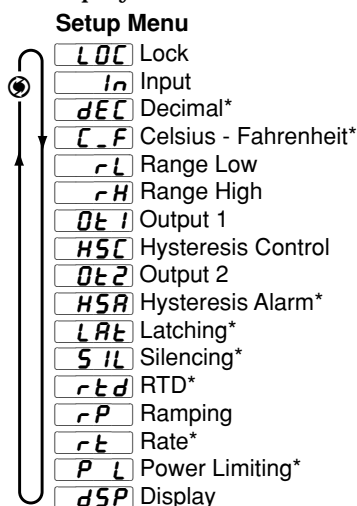


Figure 12b - The Setup Menu.

NOTE:

While in the Setup Menu, all outputs are off.

* Parameter may not always appear.

Setup Parameters

NOTE:

Shaded parameters may not appear, depending on the controller's configuration and model number.

LOC

NOTE:

Set the **LOC** parameter value as the final step in programming the Series V4 controller to prevent locking yourself out of the Operation and Setup Menu during initial programming.



CAUTION:

A process input does not have sensor break protection or bumpless transfer.



CAUTION:

Changing **ln** sets all parameters to factory defaults. Document all settings before changing this parameter.

ln

dFL

C-F

rL

At the top of the Setup Menu the Series V4 displays the user level of operation in the upper display and the **LOC** parameter in the lower display.

Press the Advance key and the value of the next parameter appears in the upper display, and the parameter appears in the lower display.

Lock: Selects the level of operator lock-out as defined below.

Range: 0 to 4 **Default:** 0

0: All operating parameters may be viewed or changed. Manual operation **is** permitted. When in manual operation, percent power is adjustable. Bumpless transfer to manual mode will occur on sensor break.

1: The set point, process value and alarm settings are the only visible parameters, set point **is** adjustable in this level. Manual operation and auto-tune **are** permitted. When in manual operation, percent power is adjustable. Bumpless transfer to manual mode will occur on sensor break.

2: The set point, process value and alarm settings are the only visible parameters, set point **is** adjustable in this level. Manual operation **is** permitted. When in manual operation, percent power is adjustable. Bumpless transfer to manual mode will occur on sensor break.

3: The set point and process value are the only visible parameters, set point **is** adjustable in this level. Manual operation is **not** permitted. Bumpless transfer is defeated and outputs are disabled on sensor break.

4: The set point and process value are the only visible parameters, set point is **not** adjustable in this level of lock-out. Manual operation is **not** permitted. Bumpless transfer is defeated and outputs are disabled on sensor break.

Input: Selects the sensor input type. The internal DIP switch must also match the **ln** parameter. See DIP switch orientation, and see input type temperature ranges in the following chart.

Range: **J**, **H** (K), **t**, **n**, **S**, **rtd**, **rtd**, **0-5**, **420** **Default:** J

Decimal: Selects the location of the decimal point for all process-related data. This parameter only appears if the **ln** parameter is set to 0-5 or 420. Make sure the internal DIP switch matches the **ln** parameter.

Range: 0, 0.0, 0.00 **Default:** 0

Celsius — Fahrenheit: Selects the units of temperature measurement for the control. This parameter only appears if the **ln** parameter is set to a thermocouple or RTD input. The default is dependent on the **dFL** parameter located in the Calibration Menu. Refer to the Appendix.

Range: **C** or **F**
If **dFL** is set to **51**: **Default:** **C**
If **dFL** is set to **US**: **Default:** **F**

Range Low: Selects the low limit of the set point. Also used to scale the low end of the process input. 0.0V_{DC} (dc) and 4mA represent **rL** Range Low for a process input. The process input is linearly scaled between **rL** and **rH**. See the model number and specification in the Appendix for range values, or refer to the following table.

Range: Sensor range low to **rH** Range High

Default: Low limit of sensor type for a thermocouple or RTD. -500 for a process input.

rh

Range High: Selects the high limit of the operating range. Also used to scale the high end of the process input. 5.0V= (dc) and 20mA represent Range High for a process input. The process input is linearly scaled between and . See the model number and specification information in the Appendix for your range values, or refer to the following table.

Range: Sensor range high to

Default: High limit of sensor type for a thermocouple or RTD. 9999 for process input.

OE1

Output 1: Selects the action for the primary output in response to the difference between set point and process variable. Select (heat) for reverse acting or select (cool) for direct acting.

Range: , **Default:**

HSC

Hysteresis-Control: Selects the switching hysteresis for Output 1 and 2 when you select 0 (on-off) under the parameter and is set to .

Range: 1 to 55, 0.1 to 5.5, 0.01 to 0.55°C/1 to 99, 0.1 to 9.9, 0.01 to 0.99°F

Default: 2, 0.2, 0.02°C/3, 0.3, 0.03°F

OE2

Output 2: Selects the output action for the secondary output.

Range: Control mode opposite Output 1 (heat or cool)
 Process alarm with alarm message displayed
 Process alarm with no alarm message displayed
 Deviation alarm with alarm message displayed
 Deviation alarm with no alarm message displayed
 None

Default:

HSA

Hysteresis - Alarm: Selects the switching hysteresis for Output 2 when is an alarm. Appears only if is not set to or . See the Operation Menu for .

Range: 1 to 5555, 0.1 to 555.5, 0.01 to 55.5°C/1 to 9999, 0.1 to 999.9, 0.01 to 99.99°F

Default: 2, 0.2, 0.02°C/3, 0.3, 0.03°F

LAE

Latching: Selects whether the alarm is latching or non-latching. Latching alarms must be cleared by pressing the ☉Infinity key before the alarm output will reset. Selecting non-latching will automatically reset the alarm output when the condition clears. Appears only if is not set to or .

Range: or **Default:**

SIL

Silencing: Selects alarm silencing (inhibit) for the alarm. Appears only when is set to or . For more information see Chapter 5.

Range: or **Default:**

rtD

RTD: Selects the RTD calibration curve for RTD inputs. Will not appear unless is set to or . is 0.003916Ω/Ω°C, is 0.003850Ω/Ω°C.

Range: or **Default:**

rP

Ramping: Choose , and the set point ramps at the selected rate in °/hr. from the process (actual) temperature to the set point, when power is applied to the controller (start up). It will not ramp with a set point change. is the same as , but ramps *with* a set point change. It ramps from the previous set point to a new one at the selected ramp rate. Select for no ramping action. When ramping, the lower display alternately flashes . The set point displayed is the desired end set point. The ramping set point is not shown. Entering the Setup Menu or manual operation disables the outputs and ramp. Once you exit either one, the Series V4 controls to the last entered set point.

Range: , , **Default:**

rt

Rate: Selects the ramping rate in degrees per hour. Will not appear if is set to .

Range: 0 to 9999

Default: 100°/hr.

P L**dSP**

Power Limiting: The power limiting function in % power for heat only. Power Limiting will function if **Pb I** is set to **0**.

Range: Dependent on output type. 0 to 100

Default: 100

Display: Selects which displays are active or viewable. Five seconds after selected, the appropriate display goes blank. Press **⏩** Advance, **⬆** Up-arrow or **⬇** Down-arrow to override this feature and cause the current value to be displayed for 5 seconds.

Range: **nor** Normal displays

Default: **nor**

SEt Set Point - lower display only

Pro Process - upper display only

**Table 15a -
Input Ranges.**

Input Type	Sensor Range Low	Sensor Range High
J	0°C/32°F	750°C/1382°F
H	-200°C/-328°F	1250°C/2282°F
E	-200°C/-328°F	350°C/662°F
n	0°C/32°F	1250°C/2282°F
S	0°C/32°F	1450°C/2642°F
red (1°)	-200°C/-328°F	700°C/1292°F
red (0.1°)	-128.8°C/-199.9°F	537.7°C/999.9°F
420	4mA/-999 units	20mA/9999 units
0-5	0V= (dc)/-999 units	5V= (dc)/9999 units

Setup Menu

**Table 15b -
Setup Menu Prompts
and Descriptions.**

Parameter	Value	Range	Factory Default	Appears If:
LOC **		0 , 1 , 2 , 3 , 4	0	
In		J , H , E , n , S , red , red , 0-5 , 420	J	DIP switch selectable.
dEC		0, 0.0, 0.00	0	In is set to 0-5 or 420
C-F		C or F	Dependent on dFL	In is set to J , H , E , n , S , red , or red
rl		rl to rh	Input dependent.	
rh		rh to rl	Input dependent.	
0k1		hE or CL	hE	
HSC		1 - 99, 0.1 - 9.9, 0.01 - 0.99°F 1 to 55, 0.1 to 5.5, 0.01 to 0.55°C	3, 0.3, 0.03°F 2, 0.2, 0.02°C	
0k2		Con = Control Pro = Process Alarm Pr = Process with no alarm message dER = Deviation alarm dE = Deviation with no alarm message no = None	Con	
HSA		1 - 9999, 0.1 - 999.9, 0.01 - 99.99°F 1 - 5555, 0.1 - 555.5, 0.01 - 55.55°C	3, 0.3, 0.03°F 2, 0.2, 0.02°C	0k2 is not set to Con or no
LRA		LRA or nLRA	nLRA	0k2 is not set to Con or no
5iL		On or OFF	OFF	0k2 is set to dER or dE
red		J15 or d.in	d.in	In is set to red or red
rP		SEr is set to Ramping on power up on is set to Ramping to set point always OFF is set to None	OFF	
rk		0 to 9999	100°/hr	rP is not set to OFF
P L		0 to 100	100	
dSP		nor = normal SEt = Set Point (lower only) Pro = Process (upper only)	nor	

**LOC Functions

- 0**: All operating parameters may be viewed or changed. Manual operation is permitted. Bumpless transfer to manual mode will occur on sensor break.
- 1**: The set point, actual, and alarm settings are only visible parameters, set point is adjustable in this level. Manual operation and auto-tune are permitted. Bumpless transfer to manual mode will occur on sensor break.
- 2**: The set point, actual, and alarm settings are the only visible parameters, set point is adjustable in this level. Manual operation is permitted. Bumpless transfer to manual mode will occur on sensor break.
- 3**: The set point and actual are the only visible parameters, set point is adjustable in this level. Manual operation is not permitted. Bumpless transfer is defeated and outputs are disabled on sensor break.
- 4**: The set point and actual are the only visible parameters, set point is not adjustable in this level. Manual operation is not permitted. Bumpless transfer is defeated and outputs are disabled on sensor break.

Figure 16 -
The Operation Menu.

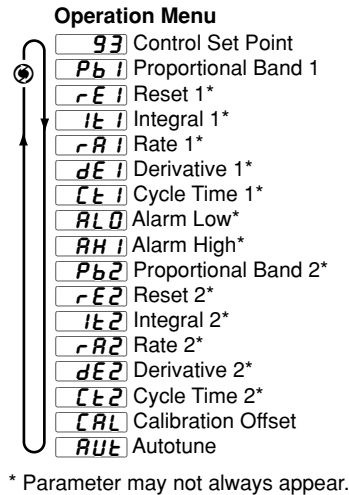
Operation Menu

NOTE:

The upper display will always return to the process value after 1 minute without key strokes.

NOTE:

Shaded parameters may not appear, depending on the controller's configuration and model number.



Operation Parameters

SP

Set Point: Sets the operating set point for Output 1. Represents the process value the system tries to achieve for Output 1. "SP" does not appear on the lower display. The control set point value is displayed and can be incremented or decremented without pressing the Advance key. The lower display may be blank if is set to . In a ramping mode, the lower display alternately flashes the desired end set point and .

Pb1
Pb2

Proportional Band 1 and 2: A proportional band, expressed in degrees or % of span, within which a proportioning function is active for Output 1 or 2. When is set to 0, the unit functions as an on-off control on Output 1 and 2. will not appear if is set to 0 or is not set to . The switching differential is determined by the parameter.

Range if is set to : : 0 to 555°C/0 to 999°F/0 to 999 Units; 0.0 to 5.5°C/0.0 to 9.9°F/0.0 to 9.9 units, : The same as except lower limit is 1 or 0.1. **Defaults:** is set to 2.5°C/25°F is set to 25

Range if is set to : 0 to 999.9% of span

Defaults: is set to 3.0% is set to 3.0%

rE1
It1
rE2
It2

Reset /Integral 1 and 2: An integral control action for Output 1 or 2 that automatically eliminates offset, or "droop," between set point and actual process temperature. /: Will not appear if is set to 0. /: Appears if is not set to 0 and is set to . Either reset or integral will appear depending on how the parameter is set in the Calibration Menu. See the Appendix.

Range if is set to : 0 to 9.99 repeats/minute **Default:** 0.00

Range if is set to : 00.1 to 9.99 minutes per repeat **Default:** 0.00

rA1
dE1
rA2
dE2

Rate/Derivative 1 and 2: The rate (derivative) function for Output 1 or Output 2. Eliminates overshoot on startup, or after the set point changes. /: Will not appear if is set to 0. /: Appears if is not set to 0 and is set to . Either rate or derivative appears depending on how is set in the Calibration Menu.

Range if is set to or : 0 to 9.99 minutes **Default:** 0.0

Ct1
Ct2

Cycle Time 1 and 2: Time for a controller to complete one time-proportioned cycle for Output 1 or Output 2; expressed in seconds. : Will not appear if is set to 0, or Output 1 is 4-20mA. : Will not appear if is set to 0 or is not set to .

If a mechanical relay or contactor is switching power to the load, a longer cycle time may be desirable to minimize wear on the mechanical components. Typical life of a mechanical relay is 100,000 cycles.

Range: 0.1 to 999.9 seconds

Default: 5.0 seconds

ALO

Alarm Low: Represents the low process alarm or low deviation alarm. This parameter will not appear if ☐ **DE2** is set to no or ☐ **Con**.

Range if ☐ **DE2** is set to ☐ **dEA** or ☐ **dE**: -999 to 0

Default: -999

Range if ☐ **DE2** is set to ☐ **PrA** or ☐ **Pr**: ☐ **rL** to ☐ **AH1** **Default:** ☐ **rL**

AH1

Alarm High: Represents the high process alarm or high deviation alarm. This parameter will not appear if ☐ **DE2** is set to ☐ **no** or ☐ **Con**.

Range if ☐ **DE2** is set to ☐ **dEA** or ☐ **dE**: 0 to 999

Default: 999

Range if ☐ **DE2** is set to ☐ **PrA** or ☐ **Pr**: ☐ **ALO** to ☐ **rH** **Default:** ☐ **rH**

CAL

Calibration Offset: Adds or subtracts degrees from the input signal.

Range: -100°C to 100°C/-180°F to 180°F/-180 units to 180 units; or

-10.0°C to 10.0°C/-18.0°F to 18.0°F

Default: 0

AUT

Autotune: Initiates an autotune.

Range: 0 is set to off, 1 is set to slow, 2 is set to medium, 3 is set to fast

Default: 0

Operation Menu Parameters

Document your Series V4 Operation Parameters.

Table 17 -
Operation Menu
Prompts and
Descriptions.

Parameter	Value	Range	Factory Default
<input type="checkbox"/> Pb1		If <input type="checkbox"/> dFL is set to <input type="checkbox"/> US : 0 - 999°F/0 - 555°C/0 - 999 Units 0 - 99.9°F/0 - 55.5°C/0 - 99.9 Units 0 is set to ON/OFF control. <input type="checkbox"/> H5C is set to switch diff. If <input type="checkbox"/> dFL is set to <input type="checkbox"/> SI : 0.0 to 999.9% of span	25°F 2.5°F 3%
<input type="checkbox"/> rE1		0.00 to 9.99 repeats/minute 0.00 = No Reset. Won't appear if <input type="checkbox"/> Pb1 is set to 0 or <input type="checkbox"/> dFL is set to <input type="checkbox"/> SI .	0.00 repeats/minute
<input type="checkbox"/> It1		0.0 - 99.9 minutes/rpt. 0.00 = No Integral. Won't appear if <input type="checkbox"/> Pb1 is set to 0 or <input type="checkbox"/> dFL is set to <input type="checkbox"/> US .	00.0 minutes/repeat
<input type="checkbox"/> rA1		0.00 to 9.99 minutes 0.00 = No Rate. Will not appear if <input type="checkbox"/> Pb1 is set to 0 or <input type="checkbox"/> dFL is set to <input type="checkbox"/> SI .	0.00 minutes
<input type="checkbox"/> dE1		0.00 - 9.99 minutes. 0.00 = No Derivative. Won't appear if <input type="checkbox"/> Pb1 is set to 0 or <input type="checkbox"/> dFL is set to <input type="checkbox"/> US .	0.00 minutes
<input type="checkbox"/> CE1		0.1 to 999.9 Won't appear if <input type="checkbox"/> Pb1 = 0, or <input type="checkbox"/> 420 .	5.0 seconds
<input type="checkbox"/> Pb2		Same as <input type="checkbox"/> Pb1 . <input type="checkbox"/> Pb2 lower limit = 1, 0.1, 0.01	
<input type="checkbox"/> rE2		Same range as <input type="checkbox"/> rE1 .	
<input type="checkbox"/> It2		Same range as <input type="checkbox"/> It1 .	
<input type="checkbox"/> rA2		Same range as <input type="checkbox"/> rA1 .	
<input type="checkbox"/> dE2		Same range as <input type="checkbox"/> dE1 .	
<input type="checkbox"/> CE2		Same range as <input type="checkbox"/> CE1 .	
<input type="checkbox"/> ALO Deviation <input type="checkbox"/> dE Process <input type="checkbox"/> Pr	-999 to 0	-999 <input type="checkbox"/> rL to <input type="checkbox"/> AH1 Will not appear if <input type="checkbox"/> DE2 is set to <input type="checkbox"/> no or <input type="checkbox"/> Con .	<input type="checkbox"/> rL
<input type="checkbox"/> AH1 Deviation <input type="checkbox"/> dE Process <input type="checkbox"/> Pr	0 to 999	999 <input type="checkbox"/> ALO to <input type="checkbox"/> rH Will not appear if <input type="checkbox"/> DE2 is set to <input type="checkbox"/> no or <input type="checkbox"/> Con .	<input type="checkbox"/> rH
<input type="checkbox"/> CAL		±180°F/±100°C/±180 Units	0
<input type="checkbox"/> AUT		0-3	0

Troubleshooting Alarms and Errors

Indication	Probable Cause(s)	Corrective Action
Power <ul style="list-style-type: none"> No power. 	<ul style="list-style-type: none"> Power to unit may be off. Fuse may be blown. Breaker may be tripped. Safety interlock door switch, etc. may be activated. Separate system limit control may be latched. Wiring may be open. Input Power may be incorrect. 	<ul style="list-style-type: none"> Check switches, fuses, breakers, interlocks, limits, connectors, etc. for energized condition and proper connection. Measure power upstream for required level. Check part number for input power required. Check wire size. Check for bad connections.
Alarms <ul style="list-style-type: none"> Alarm won't occur. 	<ul style="list-style-type: none"> Alarm output may be off. Alarm set points may be incorrect. Alarm may be silenced. Alarm sides may be incorrect. Controller may be in diagnostics mode. 	<ul style="list-style-type: none"> Configure output as an alarm. Check alarm set points. To clear the alarm, correct the alarm condition; check to see if the alarm is latched. Check the alarm sides setting. Check the alarm type setting.
<ul style="list-style-type: none"> Alarm won't occur. 	<ul style="list-style-type: none"> Alarm may be latched. Alarm set points may be incorrect.. Alarm hysteresis may be incorrect. Input may be in error condition. 	<ul style="list-style-type: none"> Check the alarm logic for compatibility with system peripherals and annunciators. Check the power limit setting Check the operation mode. Check the alarm output function. Check the °C or °F setting. Check the calibration offset value; set it to a lower level.
Error Code Messages (---- in the upper display indicates a Series V4 error; error code number is visible in bottom display)		
<ul style="list-style-type: none"> ---- E2 	<ul style="list-style-type: none"> Sensor underrange error (applies only to RTD units) 	<ul style="list-style-type: none"> Sensor input generated a value lower than allowable signal range, or A/D circuitry malfunctioned. Enter a valid input. Make sure <input type="text"/>In parameter (Setup Menu) matches your sensor and DIP switches are set accordingly.
<ul style="list-style-type: none"> ---- E4 	<ul style="list-style-type: none"> Configuration error. 	<ul style="list-style-type: none"> Microprocessor is faulty; consult factory.
<ul style="list-style-type: none"> ---- E5 	<ul style="list-style-type: none"> Non-volatile checksum error. 	<ul style="list-style-type: none"> Unless power interruption occurred while controller was storing data, nonvolatile memory is bad; consult factory.
<ul style="list-style-type: none"> ---- E6 	<ul style="list-style-type: none"> A/D underflow error. 	<ul style="list-style-type: none"> A/D circuit is underrange. Check sensor; if functioning properly, consult factory. Make sure <input type="text"/>In parameter (Setup Menu) matches your sensor and DIP switches are set accordingly.
<ul style="list-style-type: none"> ---- E7 	<ul style="list-style-type: none"> A/D overflow error. 	<ul style="list-style-type: none"> A/D circuit is overrange. Check sensor; if functioning properly, consult factory. Make sure <input type="text"/>In parameter (Setup Menu) matches your sensor and DIP switches are set accordingly.

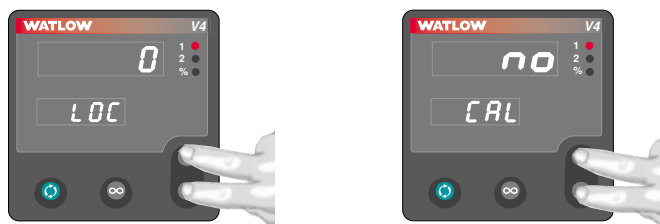
Calibration

Before attempting to calibrate, make sure you read through the procedures carefully and have the proper equipment called for in each procedure. Make sure the DIP switches are in the proper position for the input type.

Entering the Calibration Menu

In the Calibration Menu, various input signals must be supplied for the controller to go through its auto calibration. The Calibration Menu can only be entered from the **LOC** Lock parameter in the Setup Menu. Press the **Up-arrow/Down-arrow** keys simultaneously for 3 seconds (± 1 second). The **CAL** parameter appears in the lower display with "no" in the upper display.

Figure 19 -
Entering the
Calibration Menu.



NOTE:

Calibration values will not be retained unless you are in the MANUAL mode. Do not enter the MANUAL mode until you are at the correct input parameters.

NOTE:

While in the Calibration Menu, the controller output(s) go off and the alarm output (if present) is on.

Any inadvertent change in the displayed data, when pressing the **Up-arrow/Down-arrow** keys, is ignored. Calibration values won't be retained unless you are in the manual mode. Press the **Up-arrow** or **Down-arrow** key to change the upper display to **YES**. Press **Advance** to enter the calibration sequence.

Upon entering the calibration menu, the upper display window indicates **CAL**. It continues to indicate **CAL** (with the exception of calibration of the 4-20mA output) while the operator walks through the entire calibration parameter list. While calibrating the 4-20mA output, the upper display contains a numeric value to be slewed up or down until the output value is correct. The controller uses the lower display to prompt the user as to what the input should be.

With the **dFL** parameter, select either **US** parameters which include displaying °F, rate, reset, and proportional band in degrees or units. Or select **SI** (System International) and the displayed parameters are °C, integral, derivative, and proportional band in % of span.

Once the information has been properly established and maintained for at least 5 to 10 seconds, the **Advance** key may then be used to display the next prompt. After the final input is established, press the **Advance** key twice to return the controller to the configuration menu at the top of the parameter list.

Restoring Factory Calibration

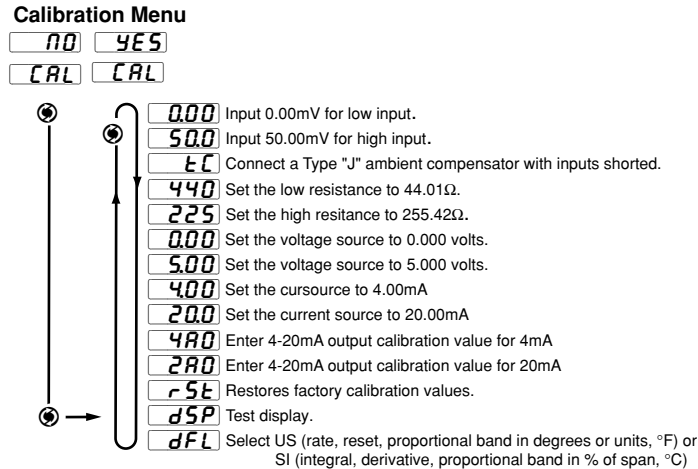
The **rSE** parameter restores the factory calibration values to the Series V4. If you calibrate your control incorrectly, you have the option to default to the original values. Once you leave the **CAL** menu, the values are entered.

1. Press the **Up-arrow/Down-arrow** keys simultaneously for three seconds. The LOC parameter appears in the lower display. Continue holding the **Up-arrow/Down-arrow** keys until the lower display reads **CAL**.
2. Press the **Up-arrow** key until **YES** appears in the upper display.
3. **Advance** through the calibration menu until **rSE** appears in the lower display.
4. Press the **Up-arrow** key until **YES** appears in the upper display.
5. Press the **Advance** key and the V4 advances to test the displays.
6. To conclude, wait 60 seconds or press the **Advance** key to reach the next prompt or to exit from the CAL menu.

This procedure is used only to restore calibration, it is not meant to clear values.

Calibration Menu

Figure 20 -
Calibration Parameters.



Thermocouple Field Calibration Procedure

Equipment Required

- Type "J" Reference Compensator with reference junction at 32°F/0°C, or Type "J" Thermocouple Calibrator set at 32°F/0°C.
- Precision millivolt source, 0-50mV min. range, 0.01mV resolution

Setup And Calibration

1. Connect the ac line voltage L1 and L2 to the proper terminals.
2. Connect the millivolt source to Terminal 6 Negative and Terminal 5 Positive on the Series V4 terminal block. Use regular 20 - 24 gauge wire. Make sure the DIP switch is set for thermocouple input.
3. Apply power to the controller and allow it to warm up for 15 minutes. **After warm-up** put the controller in the Calibration Menu. Select ☒ YES.
4. Press the ∞Infinity key twice to enter the manual mode. The controller is calibrating when % indicator light is on. Make sure the controller is in manual mode only when you are in the correct parameters.
5. At the 0.00 prompt, enter 0.00mV from the millivolt source to the control. Allow at least 10 seconds to stabilize. Press the ⏩Advance key.
6. At the 50.0 prompt, enter 50.00mV from the millivolt source to the Series V4. Allow at least 10 seconds to stabilize. Press the ⏩Advance key.
7. At the ☐ EC prompt, disconnect the millivolt source, and connect the reference compensator or thermocouple calibrator to Terminal 6 Negative, and Terminal 5 Positive on the Series V4 terminal block. If using a compensator, turn on and short the input wires. If using "J" calibrator, set to simulate 32°F/0°C. Allow 10 seconds for the control to stabilize. The controller will leave the ☐ CAL mode if one minute passes between key activations. Press the ∞Infinity key twice to exit the manual mode. To conclude the thermocouple calibration, advance the ⏩Advance key to the next prompt or exit the ☐ CAL menu.

NOTE:
Before calibration on an installed controller, make sure all data and parameters are documented.

RTD Field Calibration Procedure






Equipment Required

- 1K Ω precision decade resistance box with 0.01 Ω resolution.

NOTE:

When the % indicator light is on, the controller is automatically calibrating. Your sequence is VERY important. Always move to the next parameter before changing the calibration equipment.

Setup And Calibration






1. Connect the ac line voltage L1 and L2 to the proper terminals.
2. Connect the decade resistance box to Terminal 4, 5 and 6 on the terminal block. Use regular 20 - 24 gauge wire of the same length and type. Make sure the DIP switch is set for RTD input.
3. Apply power to the controller and allow it to warm up for 15 minutes. **After warm-up** put the controller in the menu. Select . Press the  Advance key until the **440** prompt is displayed.
4. Press the  Infinity key twice to enter the manual mode. The controller is calibrating when the % indicator light is on. Make sure the controller is in manual mode only when you are in the correct parameters.
5. At the **440** prompt, set the decade resistance box to 44.01. Allow at least 10 seconds to stabilize. Press the  Advance key.
6. At the **255** prompt, set the decade resistance box to 255.42. Allow at least 10 seconds to stabilize. Press the  Infinity key twice to exit the manual mode. The controller will leave the mode if one minute passes between key activations. To conclude the RTD calibration, press the  Advance key to the next prompt or exit the menu.

0-5 Volt Input Field Calibration Procedure

Equipment Required

- Precision dc voltage source 0-5 volt minimum range with 0.001 volt resolution.

Setup and Calibration

1. Connect the ac line voltage L1 and L2 to the proper terminals on the V4.
2. Connect the voltage/current source to Terminal 5 (+) and 6 (-) on the Series V4 terminal block. Use regular 20 - 24 gauge wire. Make sure the DIP switch is set for process input.
3. Apply power to the controller and allow it to warm up for 15 minutes. **After warm-up** put the controller in the menu. See Figure A.3. Select . Press the  Advance key until **0.00** is displayed.
4. Press  Infinity twice to enter the manual mode. The controller is calibrating when the % indicator light is on. Make sure the controller is in the manual mode **only** when you are in the correct parameters.
5. At the **0.00** parameter, set the voltage source to 0.000 volts. Allow at least 10 seconds to stabilize. Press the  Advance key.
6. At the **5.00** parameter, set the voltage source to 5.000V \approx (dc). Allow at least 10 seconds to stabilize. The controller leaves the mode if 1 minute passes between key activations. Press  Infinity twice to exit the manual mode. To conclude the 0-5 volt calibration, press the  Advance key to the next prompt or exit the menu.

NOTE:

Before calibration on an installed controller, make sure all data and parameters are documented.

4-20mA Input Field Calibration Procedure

Equipment Required:

- Precision current source 0-20mA minimum range with 0.01mA resolution.

Setup and Calibration

1. Connect the ac line voltage L1 and L2 to the proper terminals on the V4.
2. Connect the current source to Terminal 4 (-) and 6 (+) on the Series V4 terminal block. Use regular 20 - 24 gauge wire. Make sure the DIP switch is set for process input, see.
3. Apply power to the controller and allow it to warm up for 15 minutes. **After warm-up** put the controller in the **[CAL]** menu. Select **YES**. Press the **⏩** Advance key until **4** is displayed.
4. Press **⊕**Infinity twice to enter the manual mode. The controller is calibrating when the % indicator light is on. Make sure the controller is in the manual mode **only** when you are in the correct parameters.
5. At the **4.00** parameter, set the current source to 4.00mA. Allow at least 10 seconds to stabilize. Press the **⏩** Advance key.
6. At the **20.0** parameter, set the current source to 20.00mA. Allow at least 10 seconds to stabilize. The controller leaves the **[CAL]** mode if 1 minute passes between key activations. Press **⊕**Infinity twice to exit the manual mode. To conclude, press the **⏩** Advance key to the next prompt or exit the **[CAL]** menu.

NOTE:

When the % indicator light is on, the controller is automatically calibrating. Your sequence is VERY important. Always move to the next parameter before changing the calibration equipment.

4-20mA Output Field Calibration Procedure

Equipment Required:

- 300Ω, 1/2 watt 10% resistor.
- 4 - 1/2 digit Digital Multimeter.

Setup And Calibration

1. Connect the ac line voltage L1 and L2 to the proper terminals of the V4. Set the multimeter to measure current.
2. Connect the multimeter in series with the 300Ω resistor to Terminal 18 Positive and 16 Negative on the Series V4 terminal block. Use regular 20 - 24 gauge wire.
3. Apply power to the controller and allow it to warm up for 15 minutes. **After warm-up** put the controller in the **[CAL]** menu. Select **YES**. Press the **⏩** Advance key until the **4A0** prompt is displayed.
4. Press the **⊕**Infinity key twice to enter the manual mode. The controller is calibrating when the % indicator light is on.
5. At the **[4A0]** prompt, the multimeter should read approximately 4mA. Allow at least 10 seconds to stabilize.
6. Use the **⬆**Up-arrow/**⬇**Down-arrow keys (reverse acting) to adjust the reading on the multimeter for $3.85\text{mA} \pm 0.10\text{mA}$. Press the **⏩** Advance key.
7. At the **[2A0]** prompt, the multimeter should read approximately 20mA. Allow at least 10 seconds to stabilize. The controller will leave the **[CAL]** mode if one minute passes between key activations except for 4-20mA units.
8. Use the **⬆**UP/**⬇**DOWN keys (reverse acting) to adjust the reading on the multimeter for $20.15\text{mA} \pm 0.10\text{mA}$.
9. To conclude the 4-20mA output calibration, advance the **⏩** Advance key to the next prompt or exit the **[CAL]** menu.

NOTE:

Before calibration on an installed controller, make sure all data and parameters are documented.

Specifications

(1968)

Control Mode

- Microprocessor-based, user selectable control modes
- Single process input, dual output
- 2.5Hz input sampling rate
- 1Hz display update rate
- Ramp to set point: 0 to 9999 degrees or units per hour
- Heat and cool auto-tune operator interface

Operator Interface

- Sealed membrane front panel
- Dual, four-digit red or green displays
- ⓈAdvance, ⬆Up-arrow, ⬇Down-arrow, and ⓈInfinity keys
- User selectable screen display

Accuracy

- Calibration accuracy and sensor conformity: $\pm 0.1\%$ of span, $\pm 1^{\circ}\text{C}$ @ $77^{\circ}\text{F} \pm 5^{\circ}\text{F}$ ($25^{\circ}\text{C} \pm 3^{\circ}\text{C}$) ambient and rated line voltage
- Accuracy span: 1000°F (540°C) minimum
- Temperature stability: $\pm 0.2^{\circ}\text{F}/^{\circ}\text{F}$ ($\pm 0.2^{\circ}\text{C}/^{\circ}\text{C}$) rise in ambient maximum

Sensors/Inputs

- Thermocouple, grounded or ungrounded sensors
- RTD 2- or 3-wire, platinum, 100Ω @ 0°C calibration to DIN curve ($0.00385\Omega/\Omega/^{\circ}\text{C}$) or JIS curve ($0.003916\Omega/\Omega/^{\circ}\text{C}$); user selectable
- Process, $4\text{-}20\text{mA}$ @ 5Ω , or $0\text{-}5\text{V}$ (dc) @ $10\text{k}\Omega$ input impedance
- Sensor break protection de-energizes control output to protect system or selectable bumpless transfer to manual operation
- $^{\circ}\text{F}$ or $^{\circ}\text{C}$ or process units display, user selectable

Input Range

Specified temperature ranges represent the controller's operational span.

Thermocouple

Type J	32 to 1382°F	or	0 to 750°C
Type K	-328 to 2282°F	or	-200 to 1250°C
Type N	32 to 2282°F	or	0 to 1250°C
Type S	32 to 2642°F	or	0 to 1450°C
Type T	-328 to 662°F	or	-200 to 350°C

RTD Resolution (DIN or JIS)

1°	-328 to 1292°F	or	-200 to 700°C
0.1°	-199.9 to 999.9°F	or	-128.8 to 537.7°C

Process

$4\text{-}20\text{mA}$ @ 5Ω	or	-999 to 9999 units
$0\text{-}5\text{V}$ (dc) @ $10\text{k}\Omega$	or	-999 to 9999 units

Output 1 (Heating or Cooling)

- Electromechanical relay¹. Form C, rated at 8A @ 125V ~ (ac) or 5A @ 240V ~ (ac) or 5A @ 30V (dc), max. at resistive load, without contact suppression. Max. switching current is 10A , max. switching power is 2500VA , and max. switching voltage is 277V ~ (ac) or 110V (dc).
- Switched dc signal provides a non-isolated minimum turn on voltage of 3V (dc) into a minimum 500Ω

load; maximum on voltage not greater than 12V (dc) into an infinite load.

- $4\text{-}20\text{mA}$ reverse or direct acting, non-isolated 0 to 800Ω load.
- Solid-state relay³, Form A, 0.5A @ 24V ~ (ac) min., 264V ~ (ac) max., opto-isolated burst fire switched, without contact suppression. Off-state output impedance is $31\text{M}\Omega$.

Output 2 (Heat, Cool or Alarm)

- Electromechanical relay¹. Form C, rated at 8A @ 125V ~ (ac) or 5A @ 240V ~ (ac) or 5A @ 30V (dc), max. at resistive load, without contact suppression. Max. switching current is 10A , max. switching power is 2500VA , and max. switching voltage is 277V ~ (ac) or 110V (dc).
- Switched dc signal provides a non-isolated minimum turn on voltage of 3V (dc) into a minimum 500Ω load; maximum on voltage not greater than 12V (dc) into an infinite load.
- Solid-state relay³, Form A, 0.5A @ 24V ~ (ac) min., 264V ~ (ac) max., opto-isolated burst fire switched, without contact suppression. Off-state output impedance is $31\text{M}\Omega$.
- Alarm output can be latching or non-latching, and process or deviation with separate high and low values. Alarm silencing (inhibit) on power up (for deviation alarms only).

Output Configurations

Output 1

User selectable as: on/off: P, PI, PD, PID, heat or cool action

- Adjustable switching differential: 1 to 99°F (1 to 55°C)
- Proportional band: 0 (off) or 1 to 999°F (0 to 555°C) or 0.0 to 999.9 units

Integral: 0 (off) or 0.1 to 99.9 minutes per repeat

Reset: 0 (off) or 0.01 to 9.99 repeats per minute

Rate/derivative: 0 (off) or 0.01 to 9.99 minutes

Cycle time: 0.1 to 999.9 seconds

Output 2

User selectable as: Control with action opposite that of Output 1 (heating or cooling)

- Process or deviation alarm with flashing alarm message
- Process or deviation alarm without alarm message
- Alarm with separate high and low set points
- Hysteresis: 1 to 9999° or units switching differential

Line Voltage/Power

- $100\text{-}240\text{V}$ ~ (ac), -15% , $+10\%$; ($85\text{-}264\text{V}$ ~ [ac]) $50/60\text{Hz}$, $\pm 5\%$
- $14\text{-}24\text{V}$ ~ (ac/dc), $+10\%$, -15% ; ($12\text{-}26\text{V}$ ~ [ac/dc]) $50/60\text{Hz}$, $\pm 5\%$
- Fused internally (factory replaceable only) Slo-Blo® type (time-lag):
 - 1A , 250V for high voltage versions
 - 2A , 250V for low voltage versions
- Maximum power consumption: 12VA (100 to 240V ~ [ac]), 7VA (12 to 24V ~ [ac/dc])
- Data retention upon power failure via non-volatile memory

Operating Environment

- 32 to 149°F (0 to 65°C)
- 0 to 90% RH, non-condensing

Storage Temperature

- -40° to 185°F (-40° to 85°C)

Terminals

- Touch-safe, plugable terminal blocks
- 22 to 12 AWG

Controller Weight

- 0.68 lb (310g)

Shipping Weight

- 0.75 lb (0.34 kg)

Dimensions

- 1/4 DIN size and NEMA 4X² front panel make the Series V4 easy to apply and maintain in a wide variety of applications. Unique mounting brackets, gasket and collar make installation a snap.

Overall Height: 4.3 inches (109 mm)

Width: 4.3 inches (109 mm)

Depth: 4.0 inches (101 mm)

Depth Behind Panel Surface:
3.875 inches (98.4 mm)

Agency Approvals

- UL, C-UL, CE, NEMA 4X
- CE 89/336/EEC (EN 50082-2, EN 50081-2)
- CE 73/23/EEC (EN61010-1, EN 60730-1 and EN 60730-2-9)

- ¹ Electromechanical relays warranted for 100,000 closures only. Solid-state switching devices recommended for applications requiring fast cycle times or extended service life.
- ² To effect NEMA 4X rating requires a minimum mounting panel thickness of 0.06inch (1.5 mm) and surface finish not rougher than 0.000032 inch (0.000812 mm).
- ³ Switching inductive loads (relay coils, etc.) requires using an RC suppressor.

Note: These specifications are subject to change without prior notice.

Ordering Information

(1466)

Series V4

Temperature controller, single analog input, single control output, dual 4-digit displays

Power Supply

H = 100-240V~(ac)

L = 14-24V~(ac/dc)

Output 1

C = Switched dc output, non-isolated

D = Electromechanical relay, Form C, max. switching current 8A (refer to specifications), without contact suppression^{1,3}

F = Process, 4-20mA~(dc), non-isolated

K = Solid state relay, Form A, 0.5A, without contact suppression³

Output 2

A = None

C = Switched dc output, non-isolated

D = Electromechanical relay, Form C, max. switching current 8A (refer to specifications), without contact suppression^{1,3}

K = Solid state relay, Form A, 0.5A, without contact suppression³

Display Options

Upper/Lower

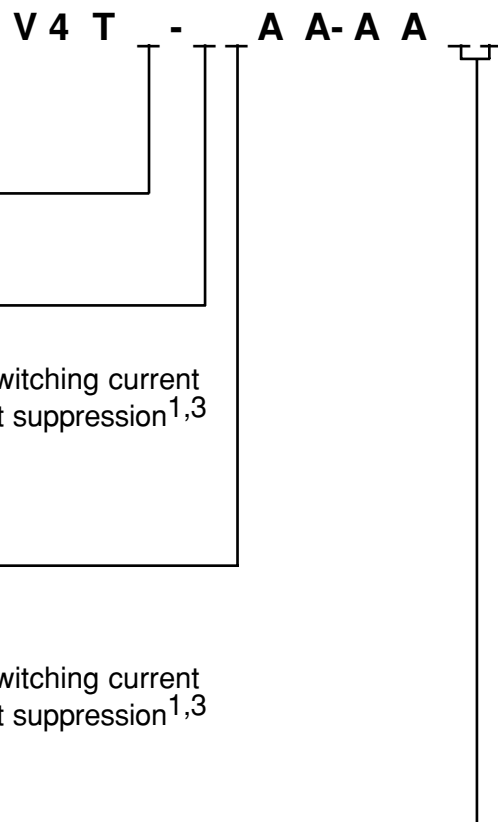
RR = Red/Red display

RG = Red/Green display

GR = Green/Red display

GG = Green/Green display

XX = Custom Overlays



Declaration of Conformity

Series V4



WATLOW SINGAPORE PTE LTD

Asia Controls

55, Ayer Rajah Crescent, #03-23
Ayer Rajah Industrial Estate
Singapore 139949

Declares that the following product:

English

Designation: Series V4

Model Number(s): V4T(H or L)-(C D F or K) (A C D or K) AA-AA (Any two letters or numbers)

Classification: Control, Installation Category II, Pollution Degree II

Rated Voltage: 100 to 240V~ (ac) or 24V≈ (ac/dc)

Rated Frequency: 50/60 Hz.

Rated Power Consumption: 12VA maximum

Meets the essential requirements of the following European Union Directive(s) using the relevant section(s) of the normalized standards and related documents shown:

89/336/EEC Electromagnetic Compatibility Directive

EN 50082-2: 1995 EMC Generic immunity standard, Part 2, Industrial environment

EN 61000-4-2: 1995 Electrostatic discharge

EN 61000-4-4: 1995 Electrical fast transients

ENV 50140: 1994 Radiated immunity

ENV 50141: 1994 Conducted immunity

ENV 50204: 1995 Cellular phone

EN 50081-2: 1994 EMC Generic emission standard, Part 2: Industrial environment

EN 55011: 1991 Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical radio-frequency equipment (Class A)

EN 61000-3-2: 1995 Limits for harmonic current emissions

EN 61000-3-2: 1995 Limitations of voltage fluctuations and flicker

72/23/EEC Low-Voltage Directive

EN 61010-1: 1993 Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1: Generic requirements

WATSON NG SAI HIONG

Name of Authorized Representative

SINGAPORE

Place of issue

General Manager

Title of Authorized Representative

December, 1998

Date of Issue

Signature of Authorized Representative

(1469)

NOTE:

Details of a “Note” appear here in the narrow margin on the outside of each page.

CAUTION:

Details of a “Caution” appear here in the narrow margin on the outside of each page.

WARNING:

Details of a “Warning” appear here in the narrow margin on the outside of each page.



Quality and Mission Statement:

Watlow Controls will be the world's best supplier of industrial temperature control products, services, and systems by exceeding our customers', employees', and shareholders' expectations.


Safety Information


We use note, caution and warning symbols throughout this book to draw your attention to important operational and safety information.

A “NOTE” marks a short message in the margin to alert you to an important detail.

A “CAUTION” safety alert appears with information that is important for protecting your equipment and performance. Be especially careful to read and follow all cautions that apply to your application.

A “WARNING” safety alert appears with information that is important for protecting you, others and equipment from damage. Pay very close attention to all warnings that apply to your application.

The safety alert symbol, , (an exclamation point in a triangle) precedes a general CAUTION or WARNING statement.

The electrical hazard symbol, , (a lightning bolt in a triangle) precedes an electric shock hazard CAUTION or WARNING safety statement.

Technical Assistance

If you encounter a problem with your Watlow controller, see the Troubleshooting Table and review all of your configuration information to verify that your selections are consistent with your application: inputs; outputs; alarms; limits; etc. If the problem persists after checking the above, you can get technical support by dialing 507/494-5656, 7 a.m. to 7 p.m. Central Standard Time. An applications engineer will discuss your application with you.

Please have the following information available when calling:

- Complete model number
- All configuration information
- User's Manual
- Diagnostic menu readings

Your Feedback

Your comments or suggestions on this manual are welcome. Please send them to: Technical Writer, Watlow Controls, 1241 Bundy Boulevard, P.O. Box 5580, Winona, MN 55987-5580. The Series V4 User's Manual is copyrighted by Watlow Winona, Inc., © July 2000, with all rights reserved.

How to Reach Us

- Phone: (507) 454-5300.
- Fax: (507) 452-4507.
- For technical support, ask for an Applications Engineer.
- To place an order, ask for Customer Service.
- To discuss a custom option, ask for a Series V4 Product Manager.

Warranty

The Watlow Series V4 is warranted to be free of defects in material and workmanship for 36 months after delivery to the first purchaser for use, providing that the units have not been misapplied. Since Watlow has no control over their use, and sometimes misuse, we cannot guarantee against failure. Watlow's obligations hereunder, at Watlow's option, are limited to replacement, repair or refund of purchase price, and parts which upon examination prove to be defective within the warranty period specified. This warranty does not apply to damage resulting from transportation, alteration, misuse, or abuse.

Returns

- Call or fax Customer Service for a Return Material Authorization (RMA) number before returning a controller.
- Put the RMA number on the shipping label, and also on a written description of the problem.
- A restocking charge of 20% of the net price is charged for all standard units returned to stock.